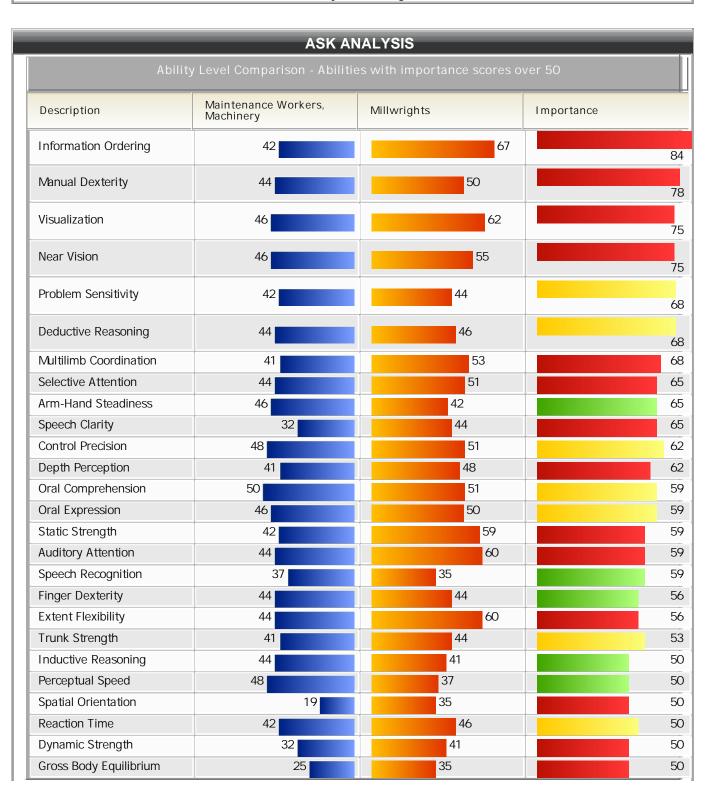
TORQ Analysis of Maintenance Workers, Machinery to Millwrights

				INPUT	SEC	ΓΙΟΝ	l:					
Transfer	Titl	е			O*NE	Т	Filters	3				
From Title:		Maintenance Workers, Machinery				043.00	Abilitie	es:	s: Importance LeveL: 50			Weight: 1
To Title:	Mil	lwright	:S		49-90	044.00	Skills:		Importa 69	nce Level		Weight: 1
Labor Market Area:	Ma	ine Sta	tewide				Knowl	edge:		nce Level	:	Weight: 1
OUTPUT SECTION:												
Grand ⁻	ΓOR	2:										90
Ability TORQ				Skills TORQ				Kno	wledge T(DRQ		
Level			84	Level			91	Leve	I	97		
Gaps To N	Narrow i	f Possil	ble	Upgra	ıde Thes	e Skills			Kn	owledge	to Ado	d
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Kno	owledge	Level	Gap	Impt
Information Ordering	67	25	84	Mathematics	69	6	74	No	Knowledg	e Upgrad	es Req	uired!
Visualization	62	16	75	Equipment Selection	66	5	82					
Static Strength	59	17	59									
Auditory Attention	60	16	59									
Extent Flexibility	60	16	56									
Multilimb Coordination	53	12	68									
Spatial Orientation	35	16	50									
Speech Clarity	44	12	65									
Near Vision Gross Body Equilibrium	55 35	9	75 50									
Manual Dexterity	50	6	78									
Selective Attention	51	7	65	-								
Dynamic Strength	41	9	50									
Depth Perception	48	7	62									
Oral Expression	50	4	59									
Reaction Time	46	4	50									
Control Precision	51	3	62									

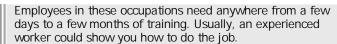
Trunk Strength	44	3	53
Problem Sensitivity	44	2	68
Deductive Reasoning	46	2	68
Oral Comprehension	51	1	59

LEVEL and IMPT (IMPORTANCE) refer to the Target Millwrights. GAP refers to level difference between Maintenance Workers, Machinery and Millwrights.





Rela	ted Work Experience Compar	ison	Required Educ	ation Level Compa	arison	
Description	Maintenance Workers, Machinery	Millwrights	Description	Maintenance Workers, Machinery	Millwrights	
10+ years	0%	8%	Doctoral	0%	0%	
8-10 years	3%	0%	Professional Degree	0%	0%	
6-8 years	O%	7%	Post-Masters Cert	0%	0%	
4-6 years	10%	29%	Master's Degree	0%	0%	
2-4 years	10%	8%	Post-Bachelor Cert	0%	0%	
1-2 years	48%	17%		2%	0%	
6-12	5%	19%	Bachelors	0%	0%	
months	•		AA or Equiv			
3-6 months	10%	0%	Some College	6%	1%	
1-3 months	0%	0%	Post-Secondary Certificate	25%	33%	
0-1 month	0%	0%	High Scool Diploma		100/	
None	9%	7%	or GED	64%	43%	
			No HSD or GED	0%	22%	
Maintenance	Workers, Machinery		Millwrights			
	Most Commo	on Educationa	al/Training Requirement	:		
Short-term or	n-the-job training		Long-term on-the-job trail	ning		
		Job Zone C				
1 - Job Zone	One: Little or No Preparation Nee	ded	3 - Job Zone Three: Medium Preparation Needed			
No previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a cashier even if he/she has never worked before.			Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electriciar must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.			
	ations may require a high school of te. Some may require a formal tra tense.		Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.			



Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

Tasks

Maintenance Workers, Machinery

Core Tasks

Generalized Work Activities:

- Repairing and Maintaining Mechanical Equipment - Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.
- Controlling Machines and Processes -Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).
- Handling and Moving Objects Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- Performing General Physical Activities -Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.

Specific Tasks

Occupation Specific Tasks:

- Clean machines and machine parts, using cleaning solvents, cloths, air guns, hoses, vacuums, or other equipment.
- Collaborate with other workers to repair or move machines, machine parts, or equipment.
- Collect and discard worn machine parts and other refuse in order to maintain machinery and work areas.
- Dismantle machines and remove parts for repair, using hand tools, chain falls, jacks, cranes, or hoists.
- Inspect or test damaged machine parts, and mark defective areas or advise supervisors of repair needs.
- Install, replace, or change machine parts and attachments, according to production specifications.
- Inventory and requisition machine parts, equipment, and other supplies so that stock can be maintained and replenished.
- Lubricate or apply adhesives or other materials to machines, machine parts

Millwrights

Core Tasks

Generalized Work Activities:

- Repairing and Maintaining Mechanical Equipment - Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.
- Operating Vehicles, Mechanized Devices, or Equipment - Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.
- Getting Information Observing, receiving, and otherwise obtaining information from all relevant sources.
- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects
- Making Decisions and Solving Problems -Analyzing information and evaluating results to choose the best solution and solve problems.

Specific Tasks

Occupation Specific Tasks:

- Align machines and equipment, using hoists, jacks, hand tools, squares, rules, micrometers, and plumb bobs.
- Assemble and install equipment, using hand tools and power tools.
- Assemble machines, and bolt, weld, rivet, or otherwise fasten them to foundation or other structures, using hand tools and power tools.
- Attach moving parts and subassemblies to basic assembly unit, using hand tools and power tools.
- Bolt parts, such as side and deck plates, jaw plates, and journals, to basic assembly unit.
- Connect power unit to machines or steam piping to equipment, and test unit to evaluate its mechanical operation.
- Construct foundation for machines, using hand tools and building materials such as wood, cement, and steel.
- Dismantle machinery and equipment for shipment to installation site, usually performing installation and maintenance work as part of team.



- other equipment, according to specified procedures.
- Measure, mix, prepare, and test chemical solutions used to clean or repair machinery and equipment.
- Read work orders and specifications to determine machines and equipment requiring repair or maintenance.
- Reassemble machines after the completion of repair or maintenance work.
- Record production, repair, and machine maintenance information.
- Remove hardened material from machines or machine parts, using abrasives, power and hand tools, jackhammers, sledgehammers, or other equipment.
- Replace or repair metal, wood, leather, glass, or other lining in machines, or in equipment compartments or containers.
- Replace, empty, or replenish machine and equipment containers such as gas tanks or boxes.
- Set up and operate machines, and adjust controls to regulate operations.
- Start machines and observe mechanical operation to determine efficiency and to detect problems.
- Transport machine parts, tools, equipment, and other material between work areas and storage, using cranes, hoists, or dollies.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- adjust or set mechanical controls or components
- apply cleaning solvents
- assist mechanic, or extractive or construction trades craft worker
- clean equipment or machinery
- clean rooms or work areas
- construct, erect, or repair wooden frameworks or structures
- cut, shape, fit, or join wood or other construction materials
- · erect scaffold
- fabricate sheet metal parts or items
- fabricate, assemble, or disassemble manufactured products by hand
- inspect machinery or equipment to determine adjustments or repairs needed
- install equipment or attachments on machinery or related structures
- inventory stock to ensure adequate supplies
- load or unload material or workpiece into machinery
- lubricate machinery, equipment, or parts

- Dismantle machines, using hammers, wrenches, crowbars, and other hand tools.
- Insert shims, adjust tension on nuts and bolts, or position parts, using hand tools and measuring instruments, to set specified clearances between moving and stationary parts.
- Install robot and modify its program, using teach pendant.
- Lay out mounting holes, using measuring instruments, and drill holes with power drill
- Level bedplate and establish centerline, using straightedge, levels, and transit.
- Move machinery and equipment, using hoists, dollies, rollers, and trucks.
- Operate engine lathe to grind, file, and turn machine parts to dimensional specifications.
- Position steel beams to support bedplates of machines and equipment, using blueprints and schematic drawings, to determine work procedures.
- Repair and lubricate machines and equipment.
- Replace defective parts of machine or adjust clearances and alignment of moving parts.
- Shrink-fit bushings, sleeves, rings, liners, gears, and wheels to specified items, using portable gas heating equipment.
- Signal crane operator to lower basic assembly units to bedplate, and align unit to centerline.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- adjust or set mechanical controls or components
- align or adjust clearances of mechanical components or parts
- assemble and install pipe sections, fittings, or plumbing fixtures
- assemble, dismantle, or reassemble equipment or machinery
- conduct performance testing
- conduct tests to locate mechanical system malfunction
- construct, erect, or repair wooden frameworks or structures
- cut, bend, or thread pipe for gas, air, hydraulic, or water lines
- determine installation, service, or repair needed
- determine project methods and procedures
- diagnose mechanical problems in machinery or equipment
- drive truck with capacity greater than 3 tons



- maintain or repair industrial or related equipment/machinery
- maintain repair records
- mix paint, ingredients, or chemicals, according to specifications
- move materials or goods between work areas
- · move or fit heavy objects
- observe or listen to machinery or equipment operation to detect malfunctions
- operate crane in construction, manufacturing or repair setting
- operate hoist, winch, or hydraulic boom
- operate sandblasting equipment
- operate vacuum or air hose
- perform safety inspections in industrial, manufacturing or repair setting
- read specifications
- read work order, instructions, formulas, or processing charts
- repair or replace malfunctioning or worn mechanical components
- repair sheet metal products
- requisition stock, materials, supplies or equipment
- signal directions or warnings to coworkers
- test materials or solutions
- test mechanical products or equipment
- understand service or repair manuals
- understand technical operating, service or repair manuals
- use acetylene welding/cutting torch
- use basic carpentry techniques
- use control or regulating devices to adjust or maintain industrial machinery
- use hand or power tools
- use hand or power woodworking tools
- use high voltage apparatus
- use knowledge of metric system
- use measuring devices in repairing industrial or heavy equipment
- use pneumatic tools
- use precision measuring devices in mechanical repair work
- use pressure gauges
- · work as a team member

Technology - Examples

Data base user interface and query software

• Database software

Spreadsheet software

Spreadsheet software

Word processing software

- · erect scaffold
- estimate time or cost for installation, repair, or construction projects
- fabricate sheet metal parts or items
- fabricate, assemble, or disassemble manufactured products by hand
- identify properties of metals for repair or fabrication activities
- inspect electrical installation for code conformance
- install electrical conduit or tubing
- install electrical fixtures or components
- install electronic equipment, components, or systems
- install equipment or attachments on machinery or related structures
- install generating plant equipment
- install industrial machinery or related heavy equipment
- install or replace meters, regulators, or related measuring or control devices
- install/connect electrical equipment to power circuit
- install/string electrical or electronic cable or wiring
- lay out machining, welding or precision assembly projects
- lubricate machinery, equipment, or parts
- maintain or repair industrial or related equipment/machinery
- maintain or repair work tools or equipment
- maintain welding machines or equipment
- move materials or goods between work areas
- move or fit heavy objects
- operate hoist, winch, or hydraulic boom
- operate lathes
- operate pneumatic test equipment
- perform detailed welding techniques
- perform hydraulic plumbing
- perform safety inspections in industrial, manufacturing or repair setting
- plan or organize work
- position, align, or level machines, equipment, or structures
- program computer numerical controlled machines
- read blueprints
- read schematics
- read specifications
- read technical drawings
- read work order, instructions, formulas, or processing charts
- repair or replace malfunctioning or worn mechanical components
- set up and operate variety of machine



Word processing software						
Tools - Examples						
Abrasive wheels						
Abrasive rubbing stones						
Adjustable widemouth pliers						
Adjustable wrenches						
Bandsaws						
Oxyacetylene torches						
Dial calipers						
Compressed air guns						
Deburring tools						
• Dollies						
• Drill bits						
• Ear plugs						
• Forklifts						
Dial indicators						
Grease guns						
Lapping equipment						
• Hammers						
• Hard hats						
Chain falls						
Hold down clamps						
• Jacks						
• Ladders						
• Lathes						
• Levels						
• Lockout hasps						
Metal cutters						
Metal inert gas M G welders						
Micrometers						
Milling machines						
Personal computers						

tools

- set up computer numerical control machines
- signal directions or warnings to coworkers
- test electrical/electronic wiring, equipment, systems or fixtures
- test mechanical products or equipment
- understand service or repair manuals
- understand technical operating, service or repair manuals
- use acetylene welding/cutting torch
- use arc welding equipment
- use basic carpentry techniques
- use basic plumbing techniques
- use combination welding procedures
- use concrete fabrication techniques
- use control or regulating devices to adjust or maintain industrial machinery
- use electrical or electronic test devices or equipment
- use hand or power tools
- use high voltage apparatus
- use knowledge of metric system
- use knowledge of welding filler rod types
- use machine tools in installation, maintenance, or repair
- use measuring devices in repairing industrial or heavy equipment
- use pipe fitting equipment
- use pneumatic tools
- use precision measuring devices in mechanical repair work
- use pressure gauges
- use robotics systems technology
- use soldering equipment
- verify levelness or verticality, using level or plumb bob
- weld together metal parts, components, or structures
- work as a team member

Technology - Examples

Computer aided design CAD software

- · Autodesk AutoCAD software
- Computer aided design CAD software
- SolidWorks CAD software

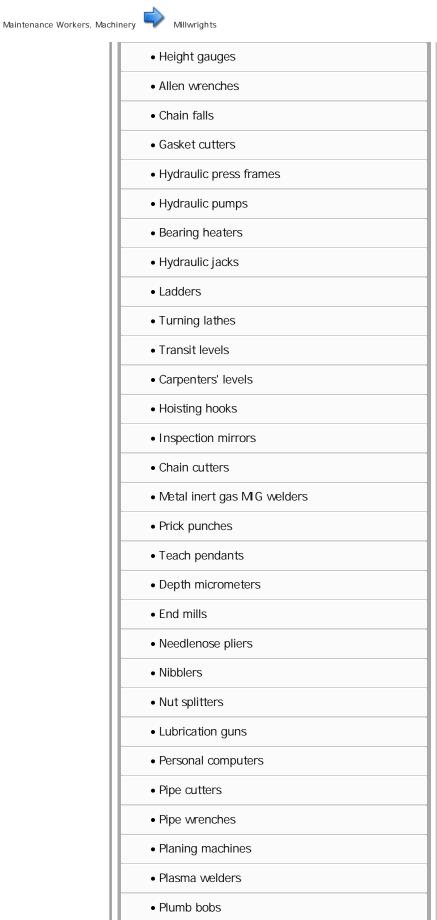
Office suite software

• Microsoft Office

Tools - Examples

Adjustable wrenches





• Pneumatic needle scalers

• Core drills



ry	Millwrights

- Dies
- Alignment telescopes
- Layout templates

Measuring tapes

- Tension indicators
- Snap gauges
- Thread gauges
- Pipe threading machines
- Tin snips
- Torque multipliers
- Tungsten inert gas TIG welding equipment
- Ultrasonic thickness detectors
- Utility knives
- Vibration indicators
- Arc welders
- Welding shields
- Spot welding equipment
- Wire brushes
- Cable cutters
- Hydraulic cranes
- Arbor presses

Labor Market Comparison							
Description	Maintenance Workers, Machinery	Millwrights	Difference				
Median Wage	\$ 34,100	\$ 41,280	\$ 7,180				
10th Percentile Wage	\$ 18,630	\$ 30,940	\$ 12,310				
25th Percentile Wage	N/A	N/A	N/A				
75th Percentile Wage	\$ 38,610	\$ 49,110	\$ 10,500				
90th Percentile Wage	\$ 43,370	\$ 54,780	\$ 11,410				
Mean Wage	\$ 32,410	\$ 41,500	\$ 9,090				
Total Employment - 2007	290	830	540				
Employment Base - 2006	337	883	546				

Projected Employment - 2016	278	774	496
Projected Job Growth - 2006-2016	-17.5 %	-12.3 %	5.2 %
Projected Annual Openings - 2006-2016	5	11	6

National Job Posting Trends	
Trend for Maintenance Workers, Machinery	Trend for Millwrights

Job Trends from Indeed.com



Data from Indeed

Recommended Programs

Industrial Machinery Main, and Repairer

Industrial Mechanics and Maintenance Technology. A program that prepares individuals to apply technical knowledge and skills to repair and maintain industrial machinery and equipment such as cranes, pumps, engines and motors, pneumatic tools, conveyor systems, production machinery, marine deck machinery, and steam propulsion, refinery, and pipeline-distribution systems.

Institution	Address	City	URL
Kennebec Valley Community College	92 Western Ave	Fairfield	www.kvcc.me.edu

Heavy/Industrial Equipment Maintenance Technologies, Other

Heavy/Industrial Equipment Maintenance Technologies, Other. Any instructional program in industrial equipment maintenance and repair not listed above.

No schools available for the program

	Maine Statew	ide Promotion	Oppor	tunities for M	aintenanc	e Workers,	Machine	ery
O* NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings

49-9043.00	Maintenance Workers, Machinery	100	1	290	\$34,100.00	\$0.00	-17%	5
51-4121.06	Welders, Cutters, and Welder Fitters	91	2	1,610	\$38,030.00	\$3,930.00	7%	49
49-9044.00	Millwrights	90	3	830	\$41,280.00	\$7,180.00	-12%	11
49-3051.00	Motorboat Mechanics	88	3	240	\$34,980.00	\$880.00	6%	8
47-5021.00	Earth Drillers, Except Oil and Gas	88	3	140	\$37,470.00	\$3,370.00	2%	4
49-9041.00	Industrial Machinery Mechanics	88	3	990	\$39,370.00	\$5, 270.00	7%	25
51-4034.00	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	88	3	110	\$34,350.00	\$250.00	-9%	2
49-3031.00	Bus and Truck Mechanics and Diesel Engine Specialists	87	3	1,180	\$34, 210.00	\$110.00	6%	34
47-2011.00	Boilermakers	87	4	60	\$39,260.00	\$5,160.00	12%	3
49-3042.00	Mobile Heavy Equipment Mechanics, Except Engines	87	4	880	\$37,010.00	\$2,910.00	5%	22
49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	86	3	440	\$49,450.00	\$15,350.00	-19%	15
49-2093.00	Electrical and Electronics Installers and Repairers, Transportation Equipment	85	3	130	\$35,960.00	\$1,860.00	4%	4
51-4111.00	Tool and Die Makers	85	3	160	\$51,670.00	\$17,570.00	-11%	2
47-4021.00	Elevator Installers and Repairers	84	4	0	\$50,960.00	\$16,860.00	0%	0
51-4041.00	Machinists	84	3	1,860	\$41,560.00	\$7,460.00	4%	35

Top Industries for Millwrights									
Industry	NAICS	% in Industry	Employment	Projected Employment	% Change				
Other building equipment contractors	238290	20.13%	11,049	12,977	17.45%				
Nonresidential building construction	236200	8.45%	4,639	5,633	21.42%				

Pulp, paper, and paperboard mills	322100	5.62%	3,084	2,318	-24.83%
Iron and steel mills and ferroalloy manufacturing	331100	4.25%	2,335	1,703	-27.05%
Plumbing, heating, and air-conditioning contractors	238220	3.94%	2,160	2,644	22.38%
Sawmills and wood preservation	321100	3.80%	2,088	1,814	-13.12%
Self-employed workers, primary job	000601	3.19%	1,752	2,023	15.45%
Veneer, plywood, and engineered wood product manufacturing	321200	2.94%	1,615	1,905	18.01%
Foundries	331500	2.50%	1,371	1,077	-21.42%
Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	811300	2.19%	1,204	1,381	14.68%
Employment services	561300	1.22%	671	921	37.15%
Nonferrous metal (except aluminum) production and processing	331400	1.15%	633	480	-24.19%
Other specialty trade contractors	238900	1.14%	627	751	19.77%
Other heavy and civil engineering construction	237900	0.88%	486	565	16.39%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	0.85%	466	406	-13.01%

Top ly direttion to	v Maintan	anaa Wark	rara Maahina		
Top Industries fo	or Maintena	ance work	ters, Machine	ery	
Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Local government, excluding education and hospitals	939300	6.40%	5,397	6,063	12.34%
Motor vehicle parts manufacturing	336300	3.89%	3,278	2,610	-20.39%
Plastics product manufacturing	326100	3.16%	2,666	2,826	6.00%
Animal production; primary job	112000	2.73%	2, 304	2,043	-11.34%
Animal slaughtering and processing	311600	2.47%	2,079	2,373	14.13%
Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	811300	2.36%	1,988	2,104	5.82%
Support activities for air transportation	488100	2.25%	1,897	2, 292	20.80%
Coal mining	212100	1.76%	1,483	1,498	0.99%
Pharmaceutical and medicine manufacturing	325400	1.71%	1,439	1,814	26.03%
Colleges, universities, and professional schools, public and private	611300	1.70%	1,437	1,608	11.87%
Fabric mills	313200	1.53%	1,286	908	-29.38%
Commercial and industrial machinery and equipment rental and leasing	532400	1.52%	1,281	1,565	22.19%
Pulp, paper, and paperboard mills	322100	1.49%	1,256	871	-30.64%

Maintenance Workers, Machinery Millwrights

Electric power generation, transmission and distribution	221100	1.47%	1,241	1,141	-8.03%
Converted paper product manufacturing	322200	1.39%	1,168	980	-16.08%